The Role Of Clinical Pharmacists In Educating Nurses To Reduce Drug-Food Interactions In Hospitalized Patients: Review Article

Section A-Research Paper

THE ROLE OF CLINICAL PHARMACISTS IN EDUCATING NURSES TO REDUCE DRUG-FOOD INTERACTIONS IN HOSPITALIZED PATIENTS: REVIEW ARTICLE

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Abstract:

Background: The co-administration of food and drugs poses a significant concern due to potential interactions that can impact the efficacy and safety of pharmacotherapy. Understanding drug-food interactions is crucial for optimizing patient outcomes and preventing adverse events. **Objective:** This study aims to assess nurses' knowledge of drug-food interactions in hospitalized patients, evaluate the impact of educational interventions by clinical pharmacists on nurses' understanding, and analyze the effect of enhanced nurse education on the occurrence of drug-food interactions. Recommendations for integrating ongoing education on drug-food interactions into nursing practice are also developed. **Conclusion:** Nurses play a vital role in medication administration and patient education, making their understanding of drug-food interactions essential for patient safety. Enhanced nurse education on pharmacology and nutrition can lead to better identification and prevention of drug-food interactions, ultimately improving patient outcomes. Collaborative efforts between healthcare professionals, including pharmacists and dietitians, are crucial in addressing complex interactions and providing comprehensive care. Investing in nurse education on drug-food interactions is paramount for delivering high-quality, patient-centered care and reducing the incidence of medication errors in healthcare settings.

Keywords: Interaction, Food, Clinical pharmacist, Nurse

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Introduction:

Food plays a crucial role in the treatment plans and overall well-being of patients [1]. A wide variety of foods have been identified for their potential in preventing and treating diseases, leading to an increasing trend in the use of healthy food among patients. It is important to pay close attention to the simultaneous consumption of food and medications due to the potential interactions that can occur between them [2]. These interactions pose a challenge to the safe and effective delivery of pharmacotherapy, impacting the efficacy and safety of drug treatment.

Drug–food interactions can manifest in various ways, categorized as pharmaceutical, pharmacokinetic, and pharmacodynamic interactions based on the underlying mechanisms [3]. Pharmaceutical interactions involve physical and chemical reactions within delivery devices like enteral feeding tubes. Pharmacokinetic interactions alter drug absorption, distribution, metabolism, and excretion, such as the chelation of ciprofloxacin with divalent cations in dairy products or the inhibition of simvastatin metabolism by grapefruit juice [4]. Pharmacodynamic interactions, on the other hand, affect the clinical effects of drugs on the body, leading to additive, synergistic, or antagonistic outcomes, like high vitamin K in the diet counteracting the effects of warfarin [5].

The extent of these interactions is influenced by factors such as the drug's characteristics, formulation, meal composition, and timing of administration. Proper dosing, timing, and compatibility with food are crucial for drugs to achieve their therapeutic goals effectively [6]. Failure to recognize and manage drug–food interactions can result in medication errors, compromising treatment outcomes or increasing the risk of adverse events and toxicities [7]. The prevalence of potential drug–food interactions varies globally, with high-risk groups including elderly patients on multiple chronic medications or those with specific conditions like hypertension, diabetes, or heart failure.

Healthcare professionals, including physicians, pharmacists, and nurses, play a vital role in identifying and managing drug–food interactions, educating patients about the risks, and minimizing adverse outcomes associated with medication use [8]. Their expertise and involvement in patient care are essential for ensuring the safe and effective use of medications in diverse healthcare settings.

Objectives:

The main objectives of this review are:

1. To assess the current knowledge and awareness levels of nurses regarding drug-food interactions in hospitalized patients.
2. To evaluate the effectiveness of educational interventions provided by clinical pharmacists in improving nurses' understanding of drug-food interactions.
3. To analyze the impact of enhanced nurse education on the incidence of drug-food interactions in hospitalized patients.
4. To develop recommendations for integrating ongoing education on drug-food interactions into nursing practice to improve patient safety and outcomes.

The role of clinical pharmacists in educating nurses about drug-food interactions in hospitalized patients:

The significance of clinical pharmacists within healthcare facilities has been increasingly acknowledged in recent times. These specialized professionals play a pivotal role in guaranteeing the safe and efficient utilization of medications among hospitalized patients. One crucial area where clinical pharmacists can have a notable influence is in providing education to nurses regarding drug-food interactions [9]. Drug-food interactions transpire when specific foods or beverages impact the absorption, metabolism, or elimination of medications, potentially leading to adverse effects or diminished therapeutic efficacy. Nurses, being at the forefront of healthcare provision, often bear the responsibility of administering medications and imparting patient education. Hence, it is imperative for nurses to possess a comprehensive understanding of drug-food interactions to avert potential harm to patients. The primary objective of this study is to explore the involvement of clinical pharmacists in educating nurses about drug-food interactions and assess the repercussions of this education on patient outcomes. By equipping nurses with the requisite knowledge and competencies to identify and forestall drug-food interactions, we can enhance medication safety and optimize patient care within hospital environments [10].

Pharmacists level of knowledge regarding drug-food interactions:

When it comes to the level of knowledge among pharmacists concerning drug-food interactions, for prevalent Food-Drug Interactions (FDIs), pharmacists exhibited satisfactory understanding for specific interactions, notably tetracycline with

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milk and dairy products, and warfarin with green vegetables, scoring 87.3% and 79.7%, respectively. The proficiency in these interactions could be attributed to their early identification, utilization, and extensive research [11], rendering them prominent instances of FDIs in academic literature, university curricula, and clinical practice. Milk and dairy products are rich in calcium and magnesium, which bind to tetracycline, forming insoluble complexes that hinder its absorption, ultimately leading to reduced bioavailability. In the case of warfarin, excessive consumption of vitamin K-rich sources like broccoli, Brussels sprouts, and lettuce can elevate the production of clotting factors, diminishing the therapeutic efficacy of warfarin and predisposing patients to clot formation [12]. Concerning alcohol-drug interactions, a notable proportion of pharmacists were knowledgeable about the interaction of alcohol with warfarin and antihistamines, and to a lesser extent, with methotrexate, isoniazid, paracetamol, and metformin. Concurrent use of these medications with alcohol could result in unfavorable outcomes. For instance, combining alcohol with warfarin heightens the risk of bleeding for the patient [13]. Similarly, simultaneous intake of alcohol with methotrexate, isoniazid, and paracetamol amplifies their hepatotoxic effects. Additionally, alcohol consumption alongside antihistamines enhances their sedative effects and central nervous system depression, elevating the patient's risk of falls and accidents [14].

Nurses level of knowledge regarding drug-food interactions:

Numerous research studies have been carried out to evaluate the extent of nurses' knowledge pertaining to interactions between drugs and food. One particular study indicated that merely 30% of nurses possessed the ability to accurately recognize common drug-food interactions, underscoring a notable deficiency in their knowledge base [1]. Another study brought to light the tendency of nurses to depend on outdated or incomplete sources of information while advising patients on drug-food interactions, thereby potentially exposing patients to risks [2]. Furthermore, a survey unveiled that a considerable number of nurses lack formal education or training on this subject, which further exacerbates their limited grasp of the topic. Subsequent research has demonstrated that nurses who engage in continuous education and training programs focused on drug-food interactions exhibit enhanced knowledge levels and confidence in their professional roles. Additionally, a study highlighted that nurses who collaborate closely

with pharmacists and dietitians are better prepared to navigate intricate drug-food interactions and deliver holistic care to patients. Collectively, these findings underscore the significance of ongoing education initiatives and interdisciplinary teamwork in augmenting nurses' understanding of drug-food interactions [3].

The impact of enhanced nurse education on the incidence of drug-food interactions in hospitalized patients:

Nurses play a crucial role in patient care, including medication administration, patient education on medications, and monitoring for adverse effects [17]. By receiving advanced education in pharmacology, nutrition, and the potential interactions between drugs and food, nurses are better equipped to recognize and prevent drug-food interactions in hospitalized patients. Through a deep understanding of the mechanisms underlying these interactions and the impact of certain foods, nurses can collaborate with other healthcare professionals to create personalized care plans that minimize the likelihood of adverse events. This proactive approach ultimately results in improved patient safety, increased medication adherence, and better overall health outcomes for hospitalized individuals. Therefore, investing in the education of nurses on drug-food interactions is essential for delivering high-quality, patient-centered care in healthcare settings [18].

Recommendations for preventing drug food interaction:

Preventing drug-food interactions is essential for optimizing the effectiveness and safety of medication regimens [19]. Educating patients on the significance of reading medication labels and adhering to healthcare professionals' instructions is a key recommendation for avoiding such interactions. Patients should be counseled to take their medications with water and to steer clear of certain foods or beverages that could impede the drug's absorption or metabolism. Healthcare providers must conduct a comprehensive review of a patient's medical history, including any known allergies or sensitivities to specific foods, before prescribing medication. Furthermore, patients should be reminded to maintain a well-balanced diet and to limit their intake of alcohol or caffeine, as these substances can potentially interact with certain medications. Regular monitoring and open communication between patients and healthcare providers are crucial for identifying and addressing any potential drug-food interactions [20].

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Several studies have evaluated the role of clinical pharmacists in reducing drug-food interactions that affect drug absorption through nurse education. DePestel et al. demonstrated that training nurses led to a decrease in the rate of interactions between fluoroquinolones and tetracyclines with multivalent cations by no more than 10%. Therefore, it is recommended that clinical pharmacists incorporate periodic training for nurses as a standard part of their responsibilities. This underscores the importance of providing educational programs about drug-food interactions to nurses on a regular basis under the guidance of clinical pharmacists [21].

Conclusion:

In conclusion, the study emphasizes the critical importance of understanding and preventing drug-food interactions in hospitalized patients. Drug-food interactions can significantly impact the efficacy and safety of medications, leading to adverse effects or reduced therapeutic outcomes. Nurses play a vital role in administering medications and educating patients, making it essential for them to have a thorough understanding of these interactions. The study highlights the need for ongoing education and collaboration between clinical pharmacists and nurses to enhance knowledge and skills in managing drug-food interactions. By investing in nurse education and implementing preventive measures, such as patient education, medication label reading, and dietary management, healthcare providers can improve patient safety and outcomes in hospital settings. Continued efforts to raise awareness and provide training on drug-food interactions are crucial for optimizing patient care and reducing the risk of adverse events.

References:

1. 1. Choi JH, Ko CM. Food and drug interactions. J Lifestyle Med. 2017;1:1. doi: 10.15280/jlm.2017.7.1.1 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
2. 2. Osuala EC, Tlou B, Ojewole EB. Assessment of knowledge of drug-food interactions among healthcare professionals in public sector hospitals in eThekwini, KwaZulu-Natal. PLoS One. 2021;16(11):e0259402. doi: 10.1371/journal.pone.0259402 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
3. 3. Zawiah M, Yousef AM, Khan AH, et al. Food-drug interactions: knowledge among pharmacists in Jordan. PLoS One. 2020;15:e0234779. doi: 10.1371/journal.pone.0234779 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
4. Aman SF, Hassan F, Naqvi BS, Hasan SM. Studies of food drug interactions. Pak J Pharm Sci. 2010;23:313–320. [PubMed] [Google Scholar]
5. 7. Spanakis M, Spanakis EG, Kondylakis H, et al. Addressing drug-drug and drug-food interactions through personalized empowerment services for healthcare. Annu Int Conf IEEE Eng Med Biol Soc. 2016;2016:5640–5643. doi: 10.1109/EMBC.2016.7592006 [PubMed] [CrossRef] [Google Scholar]
6. 8. Ased S, Wells J, Morrow LE, Malesker MA. Morrow LE and Malesker MA. Clinically significant food-drug interactions. Consult Pharm. 2018;33(11):649–657. doi: 10.4140/TCP.n.2018.649. [PubMed] [CrossRef] [Google Scholar]
7. 9. Bushra R. Aslam N and Khan AY. Food-drug interactions. Oman Med J. 2011;26:77. doi: 10.5001/omj.2011.21 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
8. Almazrou SH, Alaujan SS. Knowledge and readiness for interprofessional learning among pharmacy and clinical nutrition students at King Saud University. J Multidiscip Healthc. 2022;15:1965–1970. doi: 10.2147/JMDH.S360608 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
9. Nelson ML, Levy SB. The history of the tetracyclines. Annals of the New York Academy of Sciences. 2011;1241(1):17–32. [PubMed] [Google Scholar]
10. Nutescu EA, Shapiro NL, Ibrahim S, West P. Warfarin and its interactions with foods, herbs and other dietary supplements. Expert opinion on drug safety. 2006;5(3):433–51. Epub 2006/04/14. 10.1517/14740338.5.3.433 . [PubMed] [CrossRef] [Google Scholar]
11. Roth JA, Bradley K, Thummel KE, Veenstra DL, Boudreau D. Alcohol misuse, genetics, and major bleeding among warfarin therapy patients in a community setting. Pharmacoepidemiology and drug safety. 2015;24(6):619–27. 10.1002/pds.3769 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
12. Moore AA, Whiteman EJ, Ward KT. Risks of combined alcohol/medication use in older adults. The American journal of geriatric pharmacotherapy. 2007;5(1):64–74. 10.1016/j.amjopharm.2007.03.006 [PMC free

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article] [PubMed] [CrossRef] [Google Scholar]

13. Genser D. Food and drug interaction: consequences for the nutrition/health status. Annals of Nutrition and Metabolism. 2008;52(Suppl. 1):29–32. [PubMed] [Google Scholar]

14. Won CS, Oberlies NH, Paine MF. Mechanisms underlying food–drug interactions: inhibition of intestinal metabolism and transport. Pharmacology & therapeutics. 2012;136(2):186–201. [PMC free article] [PubMed] [Google Scholar]

15. Abdollahi M, Eslami S, Taherzadeh Z, Salehi S, Ebrahimi M. Factors Associated with Potential Food-Drug Interaction in Hospitalized Patients: A Cross-Sectional Study in Northeast Iran. Evidence Based Care. 2018;8(1):27–34. [Google Scholar]

16. Degefu, Natanim et al. "Knowledge of Drug-Food Interactions Among Healthcare Professionals Working in Public Hospitals in Ethiopia." Journal of multidisciplinary healthcare vol. 15 2635-2645. 15 Nov. 2022, doi:10.2147/JMDH.S389068

17. Zawiah, Mohammed et al. "Food-drug interactions: Knowledge among pharmacists in Jordan." PloS one vol. 15,6 e0234779. 17 Jun. 2020, doi:10.1371/journal.pone.0234779

18. Beatrice B, Berenda R, Mark F, editors. Drug Information Handbook for Advanced Practice Nursing. Ohio: Lexi Comp Inc; 2005. [Google Scholar]

19. Joseph I, Vincent T, editors. Handbook of Drug Nutrient Interactions. New Jersey : Humana Press Inc; 2004. [Google Scholar]

20. Neves SJF, Marques A. Prevalence and predictors of potential drug-food interactions among the elderly using prescription drugs. Journal of Chemical and Pharmaceutical Research. 2016;8(4):965–72. [Google Scholar] [Ref list]

21. DePestel DD, DePestel JM, Walker PC. Impact of educational interventions to prevent drug interactions between oral fluoroquinolone or tetracycline antibiotics with polyvalent cation supplement. Hosp. Pharm. 2007;42:841–5. [Google Scholar]

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